What is claimed is:

1. A microfluidic device with network micro channels, comprising:

a substrate;

at least two H-shaped micro channel formed on the substrate, the H-shaped micro channel including:

(a) two main channels; and

(b) at least one sub-channel, wherein two ends of the sub-channel are separately connected to the two main channels;

a reagent filled in the at least one sub-channel; and

a sample diversion layer having at least one sample channel with at least one sample entrance placed above the at least one sub-channel.

2. The microfluidic device with network micro channels of Claim 1, wherein the widths of the two main channels are equal and the width of the main channel is larger than the width of the sub-channel.

3. The microfluidic device with network micro channels of Claim 1, further comprising a working electrode and a reference electrode formed on a base of the sub-channel.

4. The microfluidic device with network micro channels of Claim 3, wherein the material of the reference electrode is selected from platinum and gold.

5. The microfluidic device with network micro channels of Claim 3, wherein the material of the working electrode is silver.

6. The microfluidic device with network micro channels of Claim

1, further comprising a polymer material with porous structure coated on the reagent and the substrate.

7. The microfluidic device with network micro channels of Claim 6, wherein the polymer material is a PDMS (polydimethylsiloxane) material.

8. The microfluidic device with network micro channels of Claim 1, wherein the sample diversion layer is a polymer material.

9. The microfluidic device with network micro channels of Claim 8, wherein the material of the polymer material is a PDMS material.

10. The microfluidic device with network micro channels of Claim 1, wherein the main channel has at least one reagent tank.

11. The microfluidic device with network micro channels of Claim 1, wherein the sidewalls of the main channel and the sub-channel are made from a thick film photoresist.

12. The microfluidic device with network micro channels of Claim 11, wherein the thick film photoresist is a SU-8 photoresist.

13. The microfluidic device with network micro channels of Claim 1, further comprising a silica layer formed on the base of the H-shaped micro channel.

14. The microfluidic device with network micro channels of Claim 1, wherein the reagent is an enzyme.

15. The microfluidic device with network micro channels of Claim 1, wherein the sample channel of the sample diversion layer is a closed channel.

16. The microfluidic device with network micro channels of Claim 1, wherein the sample channel of the sample diversion layer is an open channel.

18. The microfluidic device with network micro channels of Claim 1, wherein the sample entrance is a micro-needle array.

19. The microfluidic device with network micro channels of Claim 18, wherein the micro-needle array has a plurality of miniature needles arranged in a matrix.

20. The microfluidic device with network micro channels of Claim 19, wherein the inner diameter of the miniature needle is in a range of 10 μ m to 500 μ m.